aMTP888 OTP-256k16-bit Audio DSP
Application Note

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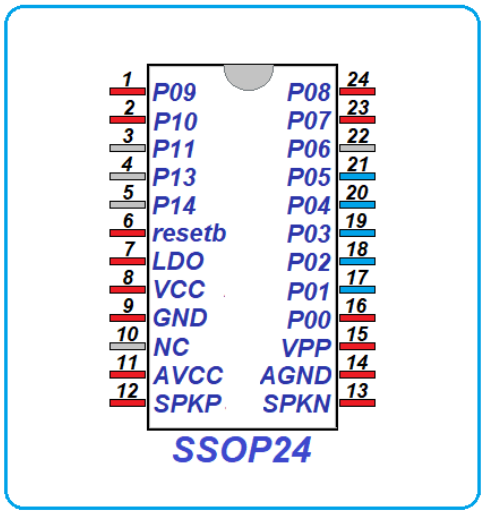
1. Feature

- 16-bit RISC DSP
- 4-Stage Pipeline · 1 Clock Cycle per Instruction
- System Speed : 32K~33M Hz (33 MIPS)
- Built-in 2M Hz RCoscillator (±0.5%)
- Clock Sources :32768 Hz / 4M Hz / PLL (Clock from P0)
- Built-in 16K Words (32K Bytes) ROM (OTP)
- Built-in 4K Words (8K Bytes) SRAM
- Built-in 40-bit MAC (Multiply Accumulator)
- MAC signed / unsigned saturate operation
- ALU signed saturate operation
- Built-in 1x 16-bit Timer and 2x 14-bit Timer
- 3x 8/10bits PWM I/O output
- 2x OP Amplifier
- 1 interpolation generator enhancing SNR
- 14x I/O Pin (LDO/VCC voltage configurable and wakeup function)
- Built-in 100mA LDO · 2.6/2.8/3.0/3.2V optionable
- Built-in 4 levels LVD (low voltage detect)
- Built-in (allways on/programmable) Watch Dog Timer
- 1x SPI · Standard/Dual/Quoad SPI protocal
- 1x 16 bit ΔΣ Multi-Level DAC
- 1x 10/11/12 bits PWM Speaker Amplifier(3 driving levels)
- Operating Voltage : 2.4V~5.1V (LVR default is 2.4V)
- Standby current: Tpy. 2uA

2. Pins Configuration



Pin No.	Designation	I/O	Description
1	P9	I/O	LDO/VCC Port I/O 9 SPI_IO1/SPI_MISO
2	P10	I/O	LDO/VCC Port I/O 10 SPI_IO0/SPI_MOSI
3	P11	I/O	LDO/VCC Port I/O 11 PWM_IO-0 SPI_IO2
4	P13	I/O	LDO/VCC Port I/O 13 PWM_IO -2
5	P14	I/O	LDO/VCC Port I/O 14
6	/RESET	I	System Reset.
7	LDO	P	System Core LDO 2.6/2.8/3.0/3.2V
8	Vcc	P	System Power Supply
9	GND	P	System Ground
10	NC	--	--
11	AVCC	P	Analog (Speaker) Power Supply
12	SPK_P/DACO	O	Speaker Positive / DAC output
13	SPK_N	O	Speaker Negtive
14	AGND	P	System Analog Ground
15	VPP	P	OTP-memory program voltage
16	P00	I/O	LDO/Vcc Port I/O 0 OPA_O Ext_Clock_In
17	P01	I/O	LDO/Vcc Port I/O 1 OPB_O
18	P02	I/O	LDO/Vcc Port I/O 2 OPA_N
19	P03	I/O	LDO/Vcc Port I/O 3 PWM_IO -0. OPA_P
20	P04	I/O	LDO/Vcc Port I/O 4 PWM_IO -1. OPB_N
21	P05	I/O	LDO/Vcc Port I/O 5 PWM_IO -2. OPB_P
22	P06	I/O	LDO/Vcc Port I/O 6 SPI_IO3
23	P07	I/O	LDO/Vcc Port I/O 7 SPI_SSB
24	P08	I/O	LDO/Vcc Port I/O 8 SPI_SCK

3. DC Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
Vcc	Operation Voltage	2.0	3.3	5.5	V	
Istd	Standby Current			2	uA	Sleep, no load
Islow	Slow Mode Current					PLL Off
Ioh	Driving Current		4		mA	VOH=2.7
Iol	Sink Current		4		mA	VOL=0.3
Iih	Input Current					Pull-High Resistor = 800K Ohm
Vih	Input High Voltage	2.0		3.3	V	
Vil	Input Low Voltage	-0.3		0.8	V	
Ipwm	Drive Current		200		mA	RL=8, Voh=2.7
Ipwm	Sink Current		200		mA	RL=8, Vol=0.3
Temperature	Operation Temperature	-40		85	℃	
Ildo	Low Power Output Current		100mA			

4. Application Circuit for Reference